

On two new species of *Oswaldella* Stechow, 1919: *O. terranovae* spec. nov. and *O. tottoni* spec. nov. (Cnidaria: Hydrozoa). Notes on Antarctic hydroids, III

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The material assigned by Totton (1930) to *Oswaldella antarctica* (Jäderholm, 1904) and *O. bifurca* (Hartlaub, 1904) has been re-examined and redescribed. This material shows such important differences with Hartlaub's and Jäderholm's species and the remaining species of *Oswaldella* that they are here considered as two new species: *O. terranovae* spec. nov. and *O. tottoni* spec. nov., respectively.

Resumen: Se ha revisado y redescrito el material estudiado y asignado a *Oswaldella antarctica* (Jäderholm, 1904) y *O. bifurca* (Hartlaub, 1904) por Totton (1930). Ambas formas han resultado ser diferentes de las especies nominales a las que fueron asignadas, así como de las otras especies conocidas del género y son consideradas en el presente trabajo como dos nuevas especies: *O. terranovae* spec. nov. y *O. tottoni* spec. nov., respectivamente.

Introduction

Totton (1930), when studying the large collection of hydroids from the British Antarctic ('Terra Nova') Expedition, 1910, referred colonies of two species of *Oswaldella* Stechow, 1919 to the then known species of the genus: *Oswaldella bifurca* (Hartlaub, 1904) and *O. antarctica* (Jäderholm, 1904). Recently, when doing a wider study of antarctic hydroids it became imperative to inspect this material and fortunately we have been able to re-examine slides of the material described by Totton. The species considered by Totton as *O. bifurca* shows such important differences with *O. bifurca* and the remaining species of *Oswaldella* that, after the study of description and figures given by Hartlaub (1904) and the examination of colonies collected by several antarctic expeditions with the R.V. 'Polarstern' and that completely agree with Hartlaub's species (unpublished data), we consider it here as a different and new species, *Oswaldella tottoni* spec. nov. The species assigned by Totton to *O. antarctica*, after comparison with the re-description of Jäderholm's species published by Peña Cantero & Vervoort (1995), is also considered to represent a different species, showing great differences with all known species of the genus; it is also described here as a new species, *O. terranovae* spec. nov.

Descriptions of the species

Oswaldella terranovae spec. nov. (fig. 1)

Oswaldella antarctica; Totton, 1930: 209-210, fig. 51.

Material examined.— Ten microslides, numbered BMNH 1929.10.28.171, from Terra Nova Stn 220, off Cape Adare, mouth of Robertson's Bay, Ross Sea, 82-92 m, 03.i.1912 (schizosyntypes).

Description.— Colonies consist of "tufts of from one to two dozen stems up to 350 mm in height with immature gonothecae" (Totton, 1930: 209). Stem divided into short internodes usually carrying from one to three apophyses. These form two longitudinal rows alternately arranged in one plane.

Each apophysis has four nematophores: two with the shape of a 'mamelon' on the upper part and near the end of the apophysis and two as simple perisarcal holes placed in the axil between apophysis and axis (fig. 1a-b).

The apophyses give rise to hydrocladia, from which they are clearly separated (fig. 1a-b). The apophysis is followed by the first thecate internode or two or three small atehate internodes (fig. 1a). In any case, the first hydrothecate internode is branched (fig. 1a-b) and gives rise to two secondary hydrocladia which, as described by Totton (1930) "rebranch unilaterally two or three times". In the slides examined it has been possible to find three tertiary hydrocladia in one of the secondary hydrocladia and two in another (fig. 1a).

The hydrocladia are divided into homomerous internodes carrying one hydrotheca and two nematophores: one mesial superior as a simple perisarcal hole situated behind the free portion of the adcauline hydrothecal wall (fig. 1c-d); the other, mesial inferior, is provided with an inconspicuous scale-shaped nematotheca and placed on the dorsal part of a strongly marked elevation of the internode under the hydrotheca (fig. 1b-h). Hydrotheca situated either on the middle or distal half of the internode. Abcauline wall straight, though strongly directed outwards (fig. 1e-g); its length increasing along the hydrocladia (e.g. length of the abcauline wall may be 156 μ m in the first internode and 286 μ m in the seventh). Adcauline wall with a conspicuous free portion. Hydrothecal aperture circular, even and, occasionally, slightly directed abcaudally (fig. 1f).

Measurements (in μ m, with mean and standard deviation).

Hydrothecae		
length abcauline wall	156-286	(230 \pm 42.4)
length free part of adcauline wall	33-39	
diameter at rim	189-221	(204.3 \pm 11.6)
Internode		
length	656-951	(781.7 \pm 71.2)
diameter under hydrotheca	182-299	(236.4 \pm 36.5)
diameter under nematophore	163-260	(198.3 \pm 29.2)
Diameter of hydrocaulus	902-1246	
Length of nematotheca	20	

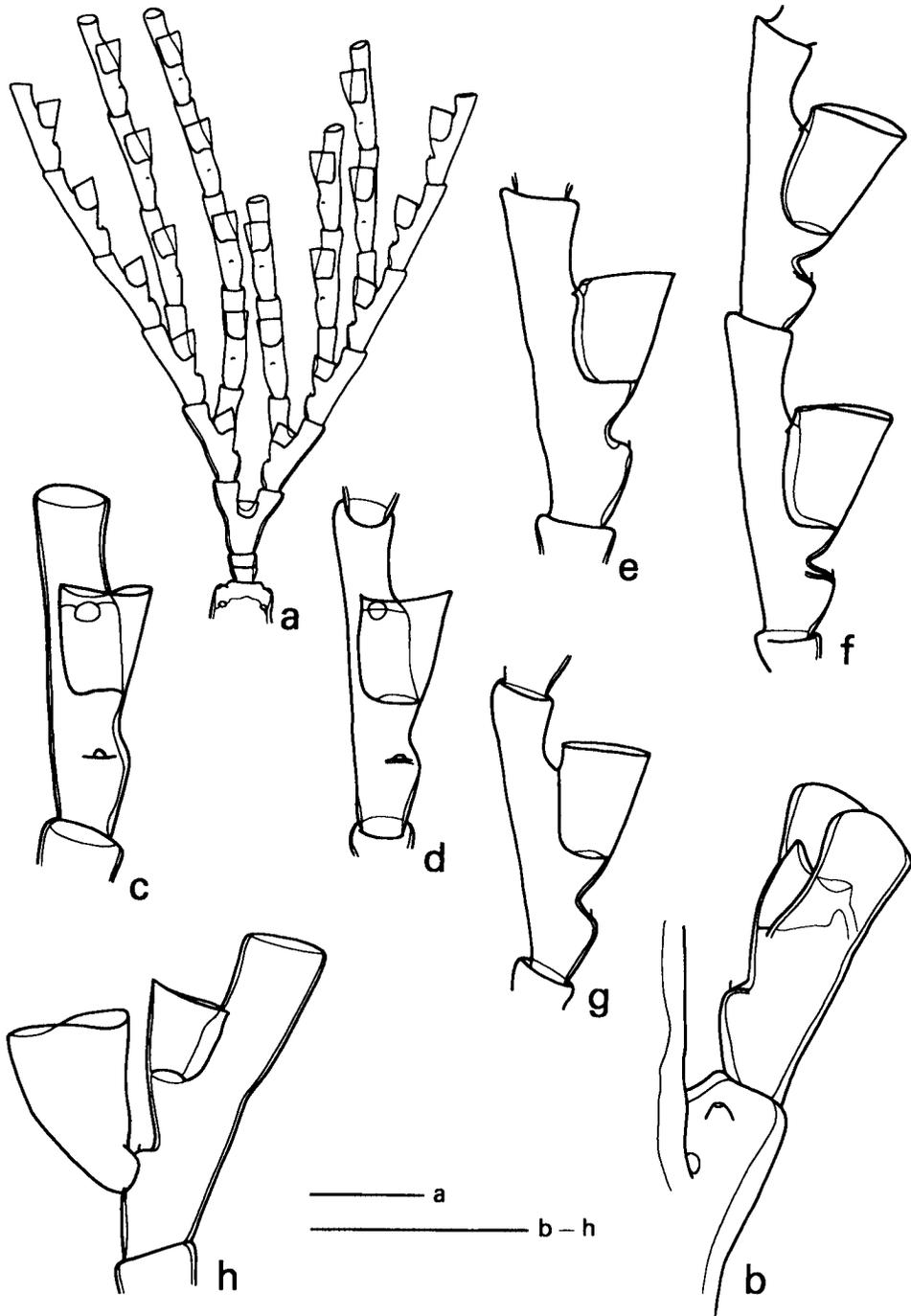


Fig. 1. *Oswaldella terranova* spec. nov. a, branch showing hydrocladial ramification and hydrothecal disposition (note also the four nematophores on the apophysis); b, first hydrocladial internode and cauline apophysis showing one axillary nematophore and one mamelon; c-h, hydrocladial internodes with hydrotheca, mesial superior nematophore and mesial inferior nematotheca (in h with immature gonotheca). (All drawings from the schizosyntypes). Scale bars: a, 1 mm; b-h, 500 μ m.

There are immature gonothecae, springing from the internodes directly under the mesial inferior nematophore. They are cone-shaped, being truncated distally and narrowing basally but without a distinct peduncle (fig. 1h).

Remarks.— Totton (1930) assigned to *Oswaldella antarctica* (Jäderholm, 1904) a species that shows a few differences with Jäderholm's species. Peña Cantero & Vervoort (1995) re-examined the type series of *O. antarctica* and re-described that species. This has permitted us, after the study of part of the material described by Totton, to recognize this material as a different species, here named *Oswaldella terranovae* spec. nov. The material in The Natural History Museum under no. 1929.10.28.171 forms the type series.

Oswaldella terranovae shares many features with *O. antarctica*, for instance the presence of an inconspicuous mesial inferior nematotheca, the size of the hydrothecae and the presence of internodes in the axis. However, there are important differences: *O. terranovae* is a more robust species, with hydrocauli of lower order, while in *O. antarctica* the axis is slender and unbranched; in *O. antarctica* there are three nematophores on the cauline apophyses: two axillary holes and one 'mamelon', while in *O. terranovae* a second 'mamelon' is present. In *O. terranovae* the free portion of the adcauline hydrothecal wall is longer and the mesial inferior nematotheca is placed on a sharper elevation of the internode.

Oswaldella stepanjantsae El Beshbeeshy, 1991, is represented in the Polarstern's material (unpublished data) and resembles *O. terranovae* in almost all its characteristics. That species also has robust colonies, stems of lower order, the stems divided into internodes, usually short athecate internodes following the cauline apophyses and hydrocladia of the third order. However, they show important differences in the shape and size of the hydrothecae and in the number of the nematophores on the cauline apophyses. In *O. stepanjantsae* the hydrothecae are longer and have a more cylindrical shape with the aperture slightly tilted towards the adcauline side. Moreover, in *O. terranovae* the hydrocladial internodes are thicker and shorter, and the mesial inferior nematotheca is placed on a sharper elevation of the internode. Finally, while in *O. terranovae* the presence of two 'mamelons' seems to be constant, in *O. stepanjantsae* the 'mamelons' are often absent.

Oswaldella terranovae is easily distinguishable from the remaining species of *Oswaldella*. *O. shetlandica* Stepan'yants, 1979 and *O. elongata* Peña Cantero et al., 1995, the two other species with four nematophores on the cauline apophyses (two axillary holes and two 'mamelons'), mainly differ from *O. terranovae* by the hydrothecal morphology and the absence of the mesial inferior nematotheca.

Oswaldella bifurca Hartlaub, 1904, *O. billardi* Briggs, 1938, *O. herwigi* El Beshbeeshy, 1991 and *O. blanconae* El Beshbeeshy, 1991, show bigger differences with *O. terranovae* in colony structure, size and shape of the hydrothecae, number and disposition of the nematophores on the cauline apophyses, etc.

Ecology and distribution.— *Oswaldella terranovae* is only known from Terra Nova Stn 220 in the Ross Sea [off Cape Adare, Robertson's Bay, 82 to 92 m depth, bottom consisting of pebbles (Totton, 1930)].

Etymology.— The specific name '*terranovae*' is chosen to honour the name of the Research Vessel 'Terra Nova', used by the British Antarctic Expedition, 1910.

Oswaldella tottoni spec. nov.
(fig. 2)

Oswaldella bifurca; Totton, 1930: 208-209, fig. 50.

Material examined.— Six microslides numbered BMNH 1929.10.28.170, from Terra Nova Stn 340, 76°56'S-164°12'E, McMurdo Sound (Ross Sea), 293 m, 25.i.1912 (schizosyntypes).

Description.— Colonies composed of "rooted tufts of stems with hydrocladia up to 240 mm high" (Totton, 1930: 208). There is no distinct division of the stem into internodes; nodes are only occasionally present, delimiting internodes of varied length.

Stems with two longitudinal rows of apophyses, alternately arranged in one plane and directed upwards under an angle of c. 45°. Each apophysis has two nematophores as simple perisarcal holes located in the axil between the apophysis and the stem (fig. 2b). The apophyses give rise to hydrocladia from which they are clearly separated (fig. 2a-b). The first internode of the hydrocladium is thecate and is the only one branched (fig. 2a-b); it gives rise to two secondary hydrocladia (fig. 2a).

Hydrocladia divided into homonomous internodes each of which carries one hydrotheca and two nematophores: one mesial superior as a simple hole in the perisarc and placed behind the free portion of the adcauline hydrothecal wall (fig. 2d); the second mesial inferior, provided with a rudimentary, scale-shaped nematotheca and placed on a slightly raised part of the internode under the hydrotheca (fig. 2c-f). This rudimentary nematotheca is absent on the first, forked internode (fig. 2b).

Hydrotheca small and low, as wide as high and located in the middle of the internode (fig. 2a-f); its length strongly increases along the hydrocladia (e.g. length of the abcauline wall may be 176 µm in the first internode and 280 µm in the tenth). Abcauline wall straight and sharply directed outwards (fig. 2c, e-f). Hydrothecal rim even, circular and perpendicular to the longitudinal axis of the internode (fig. 2c-f).

The forked internodes that give rise to hydrocladia of the second order have two mesial superior nematophores, behind the free part of the adcauline hydrothecal wall, but one on each branch of the internode. The hydrotheca is placed in the axil between both prongs.

Measurements (in µm, with mean and standard deviation).

Hydrothecae		
length abcauline wall	169-280	(205.4 ± 32.5)
diameter at rim	195-267	(225.3 ± 18.9)
Internode		
length	984-1476	(1233.1 ± 155.4)
diameter under hydrotheca	221-332	(275.3 ± 31.5)
diameter under nematophore	176-312	(238.9 ± 42.8)
Length of nematotheca	33-39	
Diameter of hydrocaulus	590-738	
Gonothecae		
length	1607-1886	
maximum diameter (lateral view)	312-459	
maximum diameter (frontal view)	492-558	

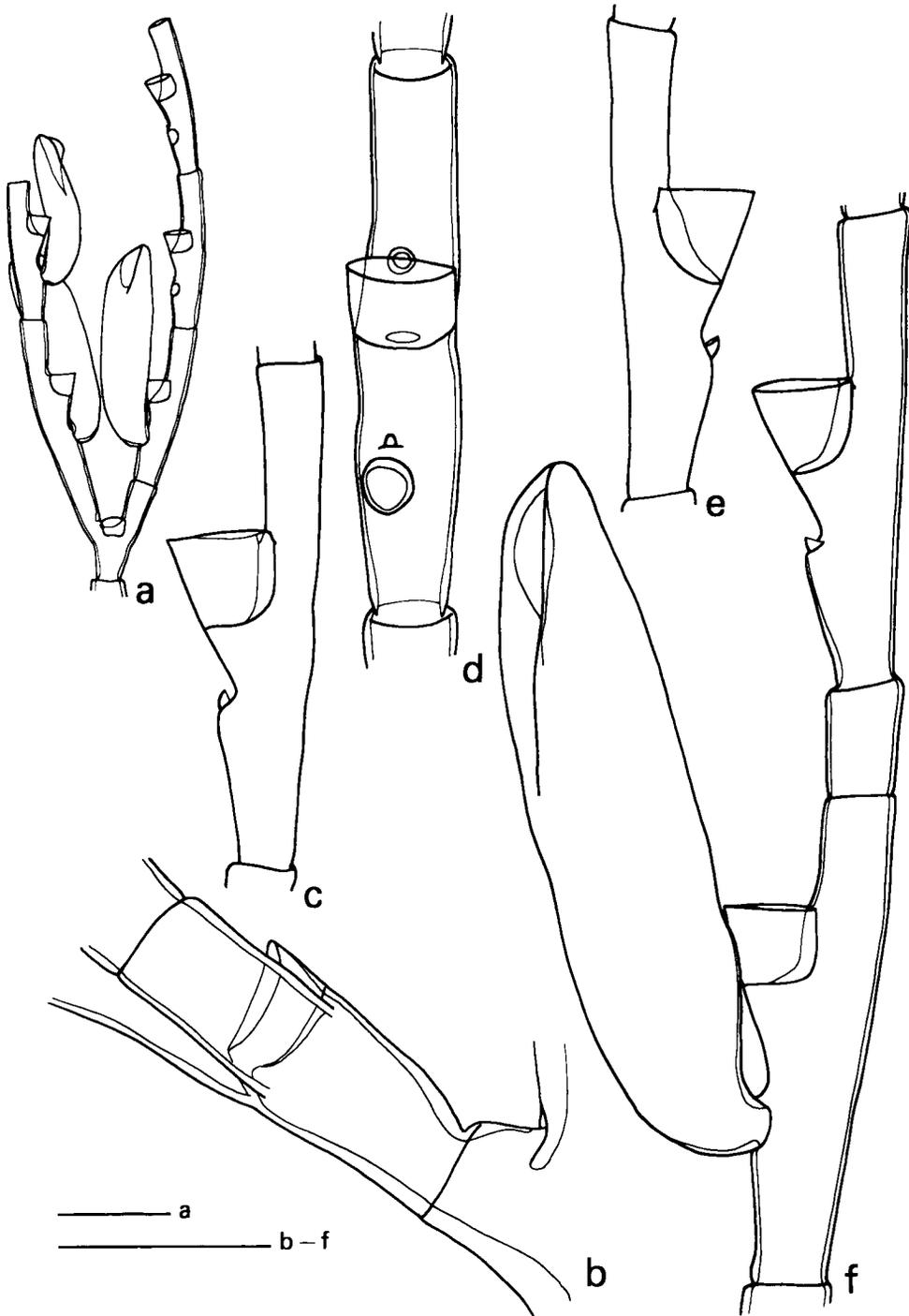


Fig. 2. *Oswaldella tottoni* spec. nov. a, branch showing hydrocladial ramification and disposition of hydrothecae and gonothecae; b, cauline apophysis showing one axillary nematophore and first hydrocladial internode; c-f, hydrocladial internodes with hydrotheca, mesial superior nematophore and mesial inferior nematophore (in f with gonotheca). (All drawings from the schizosyntypes). Scale bars: a, 1 mm; b-f, 500 μ m.

Gonothecae springing from the hydrocladial internodes directly under the mesial inferior nematophore. They are fusiform, without a distinct peduncle and with a more or less circular, subterminal aperture, placed on the abcauline side (fig. 2a, f). In lateral view they are almost cylindrical, being wider in frontal view.

Remarks.— Totton (1930) assigned to *Oswaldella bifurca* (Hartlaub, 1904) several colonies sharing with Hartlaub's species the presence of a low hydrotheca, though demonstrating a few differences with that species. The re-examination of Totton's (1930) material and the discovery of additional colonies in complete agreement with Hartlaub's description and figures and so obviously representing *O. bifurca*, in antarctic collections of R.V. 'Polarstern' (unpublished data), has made it possible to compare both forms. We recognize the material studied by Totton as a new species, *Oswaldella tottoni* spec. nov. The material in The Natural History Museum under no. 1929.10.28.170 forms the type series.

Oswaldella bifurca and *O. tottoni*, though they share the presence of a low hydrotheca, almost as wide as high, show great differences. In *O. bifurca* the cauline apophyses make an angle of c. 70° with the longitudinal axis of the stem; there is a single axillary nematophore in the shape of a hole in the perisarc and there is not a distinct separation between cauline apophyses and hydrocladia. In *O. tottoni* the cauline apophyses make an angle of c. 45°, there are two axillary nematophores and there is a distinct node between cauline apophyses and first hydrocladial internode. Also, in *O. tottoni*, only hydrocladia of the second order have been observed, while hydrocladia of the fourth order have been noticed in *O. bifurca*. While in *O. bifurca* there is no mesial inferior nematotheca, there is a conspicuous scale-shaped mesial inferior nematotheca in *O. tottoni*. In *O. bifurca* hydrothecae are placed on the basal third of the internode, while in *O. tottoni* the hydrothecae, that are bigger, are situated on the distal half. Finally, while in *O. tottoni* the rim of the hydrothecal aperture is even, it is uneven in *O. bifurca*, being frontally depressed.

Oswaldella tottoni besides points of agreement, also shows important differences with the remaining species of the genus. With *Oswaldella herwigi* El Beshbeeshy, 1991, it shares the size and shape of the hydrothecae, the angle between the cauline apophyses and the stem, the distinct separation between cauline apophyses and hydrocladia and the position of the hydrothecae on the hydrocladial internodes. However, there are differences in the hydrocladial structure, because in *O. herwigi* athecate internodes, alternating with the thecate internodes, are present and there are several secondary hydrocladia originating from the thecate internodes. Also, in *O. herwigi* there is no mesial inferior nematotheca and, though there are two nematophores on the cauline apophyses, only one is represented by an axillary hole in the perisarc, the other, with the shape of a 'mamelon', is always placed on the same side of the upper part of the apophysis.

Oswaldella blanconae El Beshbeeshy, 1991, though it also has small hydrothecae, a clear separation between hydrocladia and cauline apophyses and only secondary hydrocladia, also presents differences with *O. tottoni*. In El Beshbeeshy's species the axis is divided into internodes, there is no mesial inferior nematotheca, the hydrotheca is placed on the basal third of the hydrocladial internodes, and there is one axillary nematophore and one 'mamelon' on the cauline apophyses.

Oswaldella tottoni also resembles the species described by Peña Cantero & Ver-

voort (1995) as *Oswaldella* spec. 2 in the presence of a low hydrotheca, situated on the distal half of the internode, and a rudimentary mesial inferior nematotheca. They also share the angle of c. 45° made by the cauline apophyses and stems and the presence of a distinct separation between cauline apophyses and hydrocladia. However, the shape of the hydrothecae is different, with a big free part of the adcauline wall in *Oswaldella* spec. 2, which also has the axis broken up into internodes and presents three nematophores on the cauline apophysis: two axillary holes and one 'mamelon'.

Oswaldella antarctica (Jäderholm, 1904), *O. billardi* Briggs, 1938, *O. shetlandica* Stepan'yants, 1979 and *O. elongata* Peña Cantero et al., 1995, are mainly distinguishable from *O. tottoni* by shape and size of the hydrothecae, though they also have differences in other features. For instance, in *O. shetlandica* and *O. elongata* there are four nematophores on the cauline apophyses: two axillary holes and two 'mamelons' and there is no mesial inferior nematotheca. In *O. antarctica* there are three nematophores: two axillary holes and one 'mamelon'.

Ecology and distribution.— *Oswaldella tottoni* has been recorded by Totton (1930) from Terra Nova Stn 340, 76°56'S-164°12'E, at the entrance to McMurdo Sound, Ross Sea, 293 m depth, on muddy bottom. Fertile colonies were found in January. Totton also mentions a second station, Stn 339, 77°05'S-164°17'E, from McMurdo Sound, where the species was found at 256 m depth. Though we have not inspected this material we have tacitly assumed it to be conspecific, being recovered from a nearby locality.

Etymology.— The specific name '*tottoni*' is a homage to A. Knyvett Totton, M.C., in recognition of his monumental work on Antarctic hydroids.

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